

What is Claimed is:

- 1 1. A catalytically operating burner, comprising:
 - 2 a heat-resistant carrier material that forms the walls of several
 - 3 adjoining channels that pervade the catalyster structure in longitudinal direction
 - 4 and permit a gaseous reaction mixture to flow through the catalyster structure;
 - 5 wherein the walls are coated at least in part with a catalyst;
 - 6 wherein between an inlet end and an outlet end of the catalyst
 - 7 structure, communicating openings are constructed in the walls, through which
 - 8 the adjoining channels communicate with each other.
- 1 2. A burner as claimed in Claim 1, further comprising flow guidance
2 means for redirecting at least part of the flow in one channel into an adjoining
3 channel that communicates with the former channel via the communicating
4 opening, the flow guidance means being associated with at least one of the
5 communicating openings.
- 1 3. A burner as claimed in Claim 1, further comprising a turbulator
2 associated with at least one of the communicating openings.
- 1 4. A burner as claimed in Claim 2, wherein the flow guidance means are
2 constructed as a turbulator.
- 1 5. A burner as claimed in Claim 1, wherein the channels form at least in
2 part a winding flow path through the catalyster structure (4).
- 1 6. A burner as claimed in Claim 1, wherein the walls are coated with the
2 catalyst in such a way that some of the channels are catalytically active while
3 other channels are catalytically inactive or inert.

1 7. A burner as claimed in Claim 1, wherein the walls are coated with the
2 catalyst in such a way that at least some of the channels have at least one
3 catalytically active zone and at least one catalytically inactive or inert zone in
4 flow direction.

1 8. A burner as claimed in Claim 1, wherein the walls are coated with the
2 catalyst in such a way that at least some of the channels have several active
3 zones with differently designed catalytic activities in flow direction.

1 9. A burner as claimed in Claim 1, wherein at least part of the carrier
2 material coated with the catalyst comprises a porous material.

1 10. A burner as claimed in Claim 1, wherein at least part of the
2 carrier material coated with the catalyst comprises a woven fiber material.

1 11. A burner as claimed in Claim 1, wherein at least part of the
2 carrier material coated with the catalyst comprises a metal foil.

1 12. A burner as claimed in Claim 1, further comprising turbulators in
2 the channels, the turbulators being distributed in the channels along the catalyzer
3 structure so that the catalyzer structure is provided in flow direction with at least
4 one zone equipped with the turbulators as well as with a turbulators-free zone.

1 13. A burner as claimed in Claim 12, wherein one of the at least one
2 zones equipped with the turbulators contains the outlet end of the catalyzer
3 structure.

1 14. A burner as claimed in Claim 13, wherein the zone of the

2 catalyzer structure containing the outlet end is constructed catalytically inactive
3 or inert.

1 15. A burner as claimed in Claim 12, wherein one of the at least one
2 zones equipped with the turbulators contains the inlet end of the catalyzer
3 structure, whereby this zone is also constructed catalytically inactive or inert.

1 16. A burner as claimed in Claim 12, wherein the zone of the
2 catalyzer structure containing the inlet end is equipped with turbulators and is
3 constructed catalytically inactive or inert; that in an area between the inlet end
4 and outlet end of the catalyzer structure at least one catalytically active zone is
5 constructed so that a zone of the catalyzer structure containing the outlet end is
6 equipped with turbulators and is constructed catalytically inactive or inert.

1 17. A burner as claimed in Claim 12, wherein the zone of the
2 catalyzer structure containing the inlet end is equipped with turbulators and is
3 constructed catalytically highly active; wherein, in an area between the inlet end
4 and outlet end of the catalyzer structure, a turbulators-free zone is constructed
5 catalytically active; and wherein a zone of the catalyzer structure containing the
6 outlet end is equipped with turbulators.

1 18. A burner as claimed in Claim 1, wherein the carrier material
2 comprises at least several layers, whereby each layer is formed of a material web
3 that has been folded, corrugated, or both, in zigzag or triangular or rectangular
4 shape, whereby the apex lines or apex surfaces of the folds and/or waves in
5 material webs adjoining each other transversely in flow direction are oriented
6 differently, whereby adjoining material webs rest against each other at the
7 intersecting apex lines or apex surfaces and form channels between them.

1 19. A burner as claimed in Claim 18, wherein the apex lines or apex
2 surfaces are oriented at an angle to the longitudinal direction of the catalyzer
3 structure.

1 20. A burner as claimed in Claim 1, wherein the carrier material
2 comprises a material web folded several times, whereby the apex lines or apex
3 surfaces of the folds extend approximately in the longitudinal direction of the
4 catalyzer structure, whereby planar wall sections are formed between
5 consecutive apex lines or apex surfaces, whereby adjoining planar wall sections
6 extend parallel to each other, and whereby the channels are formed between the
7 adjoining wall sections.

1 21. A burner as claimed in Claim 1, wherein the flow guidance
2 means, the turbulators, or both, in the walls are formed by triangular wings,
3 wherein two triangle sides of the wing are cut free and wherein the wing is bent
4 on the third triangle side in such a way that the wing projects into one of the
5 channels, wherein the triangular openings created hereby in the walls form the
6 communicating openings.

1 22. A burner as claimed in Claim 21, wherein the bent triangle side of
2 the wing extends approximately transversely to the extension direction of the
3 apex lines or apex surfaces of the material web, and that the triangle tip of the
4 wing is pointed upstream.

1 23. A burner as claimed in Claim 1, wherein at least one of the
2 channels is provided along the catalyzer structure at at least one point with a
3 guide vane structure that is oriented transversely to the flow direction and that
4 forces a stream flowing through it to rotate around an axis extending parallel to
5 the flow direction.

1 24. A process of using a catalyst structure, comprising the step of:
2 providing a catalyst structure including a heat-resistant carrier
3 material that forms the walls of several adjoining channels that pervade the
4 catalyst structure in longitudinal direction and enable that a gaseous reaction
5 mixture flows through the catalyst structure, wherein the walls are coated at
6 least in part with a catalyst and wherein between an inlet end and an outlet end
7 of the catalyst structure communicating openings are constructed in the walls,
8 through which the adjoining channels are communicating with each other, in a
9 catalytically operating burner; and
10 flowing a gaseous reaction mixture through the catalyst structure.